

REMARKS

Claims 1, 3-5 and 7-10 are pending in this application. Claims 1 and 7 have been amended. Claim 2 has been canceled and its limitations have been incorporated in amended independent claim 1. No new matter has been introduced.

Claims 1 and 7 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Öttele in view of Dunster. This rejection is respectfully traversed.

The subject matter of claims 1 and 7 would not have been obvious over Öttele and Dunster, whether considered alone or in combination. The cited references, alone or in combination, do not disclose, teach or suggest all limitations of amended independent claims 1 and 7. Öttele and Dunster fail to disclose, teach or suggest "an inner surface of the metallic basket . . . coated with a ceramic material," as claim 1 recites, or the steps recited in claim 7.

Öttele discloses a reactor for purifying exhaust gasses, which does not take place at the same elevated pressures as catalytic partial oxidation (CPO) of hydrocarbons does. The reactor outlet is the exhaust pipe of the engine (col. 2, l. 53), which means that the pressure in this reactor is atmospheric pressure plus the friction pressure drop created by the gas flowing through the reactor and exhaust pipe. The pressure for CPO is generally known to be around 4 MPa (conform the excerpt of "Ullmann's Encyclopedia of Industrial Chemistry," attached herewith as Exhibit A).

Further, the reactor of Öttele is a small reactor with a catalyst body (col. 1, l. 42), where the gas stream comes from an internal combustion engine (col. 3, ll. 46, 47). Such a reactor is often horizontal and, thus, bottom support of the catalyst is not required.

Contrary to this, in the reactor of the claimed invention, the catalyst may be a particulate catalyst (claim 1) and with a vertical, downwards flow direction.

The requirements to tightness are also not the same. In the reactor of the claimed invention the consequence of leakage between basket and pressure shell is loss of valuable product gas or off-spec product gas. Thereby, the foil of Öttele cannot be compared to the big basket of the claimed invention. Accordingly, the teaching and problems of Öttele do not apply to the claimed invention.

Dunster attempts to solve the problem of thorough mixing of a hydrocarbon feed and an oxygen containing feed to a monolithic CPO catalyst by an internal arrangement at an upper part of a reactor. The detailed design of Dunster is unclear on whether the upper part is gas leak tight as it is the bottom. If it is not, feed gas can migrate to the space between pressure shell and hydrocarbon feed inlet; if it is, the pressure in this space is considerably less, meaning that the interior shell must be designed for nearly full pressure and temperature.

A person skilled in the art would not have been motivated to combine Öttele with Dunster, as the Examiner asserts. The reactor of Öttele provides a cheap exhaust gas purification device which has two sheets of thin foil only, one being fixed between shell and an inlet flange, and the other only between shell and an outlet flange, and both surrounding a catalyst body. A person of ordinary skill in the art would not have been motivated to modify the reactor of Dunster so that only an inlet channel is sealed to reactor shell hindering feed gas to enter an insulating layer and thereby by-passing a catalyst, and so that the basket has bottom which supports a catalyst bed, and so that there is no outlet channel ensuring operating pressure on both outer side and inner side of the basket and

ensuring that no gas will by-pass the catalyst and at the same time ensuring that outer pressure shell is designed for full pressure (and low temperature) and basket is designed for full temperature (and low pressure).

A skilled person would not have been motivated to change the reactor of Öttele with the reactor of Dunster, to exclude the outlet channel, as this is the only channel in that reactor.

In addition, a person skilled in the art would not have been motivated to modify the reactor of Dunster with the reactor of Öttele to arrive to the claimed reactor with a gas tight connection between an inlet channel and outer pressure shell, as Dunster has no inlet channel for the hydrocarbon/oxygen gas feed and Öttele has no particulate catalyst, no catalyst support, and no catalyst bed support for a particulate catalyst bed. To combine Öttele with Dunster, to arrive at the reactor of claimed invention, is pure hindsight.

In the May 15, 2007 Office Action, claim 2 (which is now canceled and the limitations of which have been incorporated in amended independent claim 1) was rejected under 35 U.S.C. § 103(a) as being unpatentable over Öttele in view of Dunster and Revault. Applicants submit that the subject matter of amended independent claim 1 (which now incorporates the limitations of claim 2) would not have been obvious over the cited prior art references, whether considered alone or in combination.

The reactor of Revault cleans exhaust gas and comprises an outer shell, and insulating layer (sleeve) and a ceramic porous body (catalyst). The porous body can be provided with impermeable ceramic sidewalls (col. 4, ll. 12-15), which may be glazed (col. 4, ll. 15-17). The porous body is not surrounded by any metallic wall, but is directly

inserted into the sleeve of insulating material (col. 3, l. 55 – col. 4, l. 1). Thus, the reactor of Revault will not suggest to a person of ordinary skill in the art to coat the inner side of an already gas tight metallic basket with a ceramic layer, which even may be a catalytic ceramic layer.

For at least the reasons above, the Office Action fails to establish a *prima facie* case of obviousness, and withdrawal of the rejection of claims 1 and 7 is respectfully requested.

Claims 3-5 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Öttele in view of Dunster and Mentschel. This rejection is respectfully traversed.

Mentschel discloses a reactor for producing fuel for a combustion engine (col. 2, l. 47). The feed gas is heated by the product gas (Fig. 2; col. 6, ll. 41-44). In the vertical middle of this reactor, an outer wall 101 forms a recess 105 (Fig. 2; col. 6, l. 30). The recess 105 surrounds a post 113 (col. 6, l. 30; Fig. 2). In the recess, a heater may be inserted (col. 7, ll. 25-26). This means that the heater is installed outside the outer wall 101 and this is not installed inside the reactor. Further, the heater heats the gas, which has already to some extent been heated by the catalyst effluent gas. Thus, the reactor of Mentschel will not suggest a person skilled in the art to install a heater inside a reactor pressure shell, as in the reactor of claimed invention.

For at least the reasons above, the Office Action fails to establish a *prima facie* case of obviousness, and withdrawal of the rejection of claims 3-5 is also respectfully requested.

Claims 8 and 9 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Öttele in view of Dunster and Hahn. This rejection is respectfully traversed.

Hahn discloses a process for purification of bromine and mentions removing hydrocarbons by heating to 1000°C and adding oxygen to oxidize the hydrocarbons (col. 1, ll. 49-56). This aims to fully oxidize the hydrocarbons (col. 2, ll. 56-57). This is in contrast to the partial oxidation of hydrocarbons in the claimed invention and, thus, the process of Hahn cannot be compared to that of the claimed invention. Hahn suggests no optimal temperature for a partial oxidation reaction.

For at least the reasons above, the Office Action fails to establish a *prima facie* case of obviousness, and withdrawal of the rejection of claims 8 and 9 is also respectfully requested.

Claim 10 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Öttele in view of Dunster and Werges. This rejection is respectfully traversed.

Werges discloses a reactor, wherein a liquid enters at the bottom and flows upwards (col. 5, ll. 42-44, Fig. 7) through a catalyst bed supported by a grid (ref. 63 in Fig. 7; col. 6, l. 14). A person of ordinary skill in the art would not consider this reference for choosing a catalyst support in a reactor with a downwards gas flow.

For at least the reasons above, the Office Action fails to establish a *prima facie* case of obviousness, and withdrawal of the rejection of claim 10 is respectfully requested.

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Allowance of all pending claims is solicited.

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